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(Seal of
the Patent
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JOINING OF THIN FLOATING HARD FLOORS

The present invention relates to joining methods for thin floating hard floors by means of glue, double-adhesive
5 tape and mechanical locking, consisting of grooves ground in the underside of the floor panels and a loose strip which permit rapid, concealed, floating, exact and highly resistant joining of thin floor panels independently of the thickness tolerances of the floor panels.

10

Background of the Invention

Laminated floors have in a short time taken a substantial share of the market for renovation floors. All thin lami-
15 nated floors which are laid as "floating floors" without being attached to the supporting structure, consist of a surface layer of decorated laminate, a carrier of fibre-board or particle board and a balance layer of laminate or impregnated paper. The floor panels are as a rule
20 200 * 1200 mm, and their long and short sides are formed with tongues and grooves. The floor is laid by applying glue in the groove and forcing the floor panels together (see Fig. 1).

25 The laminate consisting of a decorative wear layer of melamine and a core of phenol has very good properties in respect of wear resistance, impact strength and water resistance. The weak point of the floor is the carrier of particle board, which has essentially poorer proper-
30 ties than the laminate, but is needed for stability and, above all, to make it possible to provide a tongue-and-groove joint. This restricts the thickness to at least 7 mm. Thinner floors have the advantage that in renovation, it is possible to cope with low thresholds and

there is no need of planing the doors. The method of laying the floor is also complicated and time-consuming since glue must be applied in every groove.

- 5 The above-mentioned disadvantages can be overcome by removing the carrier and increasing the laminate thickness by some suitable modification of the phenol core. Such a compact laminate has even at a thickness of 3 mm better properties than the present laminated floors.
- 10 Laying would be facilitated to a great extent if double-adhesive tape or mechanical locking could be used. The problem is that none of the joining methods available today can be applied to floating floors of such small thickness. Grooves and tongues and strips inserted into
- 15 the material cannot be used in thin materials and especially not together with double-adhesive tape.

A further problem is that compact laminates must be composed symmetrically, i.e. the upper and the lower side

20 should consist of similar thermosetting resins and fibres to make the laminated panels flat. In connection with manufacture, the laminated panels will have a thickness tolerance of about $\pm 0.2-0.3$ mm. The panels cannot have uniform thickness by grinding of the rear side since this

25 destroys the symmetrical design, resulting in bulging. Panels of different thicknesses mean that the joint edge will be subjected to very high loads if formed in a traditional manner.

- 30 Double-adhesive tape is a very convenient adhering method in many contexts, but the problem is that it catches directly and does not allow the material to be adjusted as is the case in ordinary gluing, in which it is possible, after applying glue in the groove, to first press
- 35 the groove and tongue together at the long side and subsequently displace the floor panel along the long side such that also the tongue and groove at the short side

engage with each other, whereupon the glue hardens. A further problem is that a large laying surface and relatively high initial pressure are required to provide joints of high strength. With a large laying surface it is possible to cope with high loads in the shearing direction along the tape, whereas the release strength perpendicular to the tape is considerably lower. Since there is a risk of the floor panels bulging owing to uneven air humidity, it should be aimed at designing the joint such that the release forces are converted into shearing forces. Double-adhesive tape does not function in the joining methods that are used today for floating joints.

The problem of mechanical locking is that it is difficult to achieve sufficient strength in thin constructions and to provide locking of both long sides and short sides. Since it must be possible to cut the floor panels with a handsaw, the joint is not allowed to contain hard materials. There are today no joining methods for floating joints, which are based on mechanical locking of all sides.

Object of the Invention and Main Characteristics

The object of the invention is to provide methods for joining thin floating floor panels of different thicknesses, which permit the floor panels to be laid with smooth surface joints, the strength in the joint to be high and joining to be carried out with glue, double-adhesive tape and mechanical locking. This object is achieved by grooves being ground in the underside of the long and short sides of the floor panels such that the distance from the surface of the floor panels to the upper part of the groove has a constant dimension which is slightly smaller than the minimum thickness of the floor panels. The groove eliminates thickness tolerances

and permits a strip of laminate, plastic or aluminium having a thickness slightly greater than the difference between the thinnest and the thickest floor panel and a width corresponding to twice the groove width, coated
5 with glue or double-adhesive strip, to be attached to the underside of one floor panel such that half the strip width projects beyond the joint edge, and the other floor panel can be laid in position on the projecting part of the strip edge-to-edge with the first-mentioned floor
10 panel, and the floor panels always rest in the joint on the strip which takes up all the load to which the joint is subjected and which transfers the vertical forces to the existing subfloor. The upper part of the joint is completely flat independently of the thickness tolerance
15 of the floor panels, and the floor floats without being attached to the supporting structure. By a suitable design of grooves, strips and joint edges on the long and short sides of the floor panels, the floor panels can be laid by means of glue, double-adhesive tape and mechanical
20 locking.

Description of Drawings

Fig. 1 shows the design of existing laminated floors.
25

Fig. 2 shows the joining of thin floating hard floors by means of glue and double-adhesive tape.

Fig. 3 shows the joining of thin floating hard floors by means of glue and double-adhesive tape, joint edges being
30 bevelled for transferring lifting forces into shearing forces.

Fig. 4 shows the joining of thin floating hard floors by means of glue and double-adhesive tape, grooves being
35 milled in joint edges for mechanical locking of upward motion.

Fig. 5 shows the joining of thin floating hard floors by mechanical locking in all directions.

5 **Description of Embodiments**

In the drawings, Figs 2-5, a floor panel having a minimum thickness is designated 1, a floor panel having a maximum thickness is designated 2, grooves ground in the under-
10 side of a floor panel is designated 3, a strip of laminate, plastic or aluminium is designated 4, a glue layer is designated 5, the surface of the floor panels is designated 6, obliquely sawn joint edges are designated 7, a milled groove in the underside of a joint edge is
15 designated 8, a milled groove in the upper side of a joint edge is designated 9, a locking pin on a strip is designated 10, a locking groove in the underside of a floor panel is designated 11, a bevelled edge of a locking pin is designated 12 and the existing subfloor is
20 designated 13.

CLAIMS

1. Joining of thin floating hard floors, consisting of
5 grooves (3), a strip (4) and a glue layer of double-adhe-
sive tape or glue (5),
c h a r a c t e r i s e d i n t h a t
grooves (3) are provided on the underside of the long and
short sides of the floor panels such that the distance
10 from the surface (6) of the floor panels to the groove
always keeps a constant measure which is slightly smaller
than the minimum thickness of the floor panels, wherein a
strip (4) with a glue layer (5) and a width corresponding
to twice the groove width and a thickness including the
15 glued layer slightly greater than the maximum difference
between the thinnest (1) floor panel and the thickest (2)
floor panel is glued on the underside of one floor panel
(2) such that half the strip width, which is coated with
glue or double-adhesive tape, projects, on which the
20 other floor panel (1), when laying the floor, is laid
edge-to-edge such that both floor panels in the joint
rest merely on the strip.
2. An arrangement according to claim 1,
25 c h a r a c t e r i s e d i n t h a t
the joint edges (7) of said floor panels are obliquely
sawn such that one floor panel (1) when being laid is
inserted under the other floor panel (2) such that a
horizontal motion is required to make said floor panel
30 (1) come loose from the double-adhesive tape and rise
from the strip (4).
3. The arrangement according to claim 1,
c h a r a c t e r i s e d i n t h a t
35 on the joint edge (8) of one floor panel (2) a recess is
made on the underside and on the joint edge (9) of the

other floor panel (1) a recess is made on the upper side such that one floor panel (1) when being laid can be inserted under the other floor panel (2) in such a manner that mechanical locking against lifting forces arises.

5

4. The arrangement according to claim 3,
c h a r a c t e r i s e d i n t h a t

the strip (4) which is glued to one floor panel (2) is made of an elastic material and is provided, in the projecting portion, with a locking pin (10) which is adapted to a locking groove (11) which is provided on the under-
10 side of the other floor panel (1) in such a manner that said locking pin (10) engages in said locking groove (11) when the long sides of the floor panels are pressed
15 together and locks such that a motion is possible only along the long ends of said floor panels, the floor panel (1) being laterally moved until it meets the short end of another floor panel, where the joint edge (9) meets the bevelled part of said locking pin (12) which bends said
20 strip (4) downwards to some extent such that the floor panels can abut against each other in the short end and locking occurs, whereby said floor panel (1) is mechanically locked in all directions and the floor can be laid without using glue.

Abstract

Joining of thin floating hard floors. By suitable adaptation of the core of laminate, highly efficient compact laminated floors can be made which are only 3-4 mm thick. The problem is that there is no suitable method for joining thin hard floor panels. This problem has been overcome by providing a groove (3) in the underside of the short and long sides of the floor panels, a strip (4) being attached to one floor panel (1), whereupon the other floor panel (2) is laid down. By a special design of groove, strip and joint edges, floor-laying can be carried out by means of glue, double-adhesive tape and mechanical locking.

Fig. 1

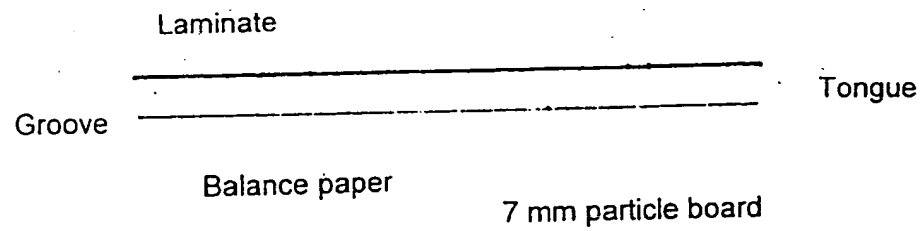
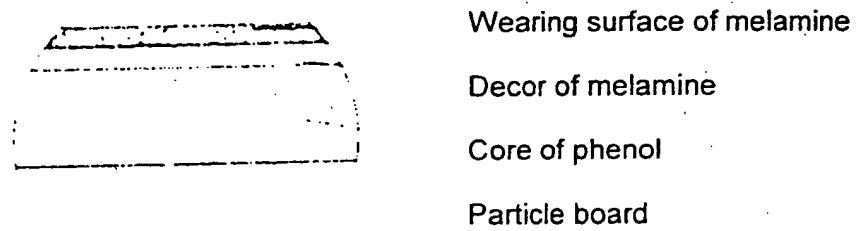


FIG. 2

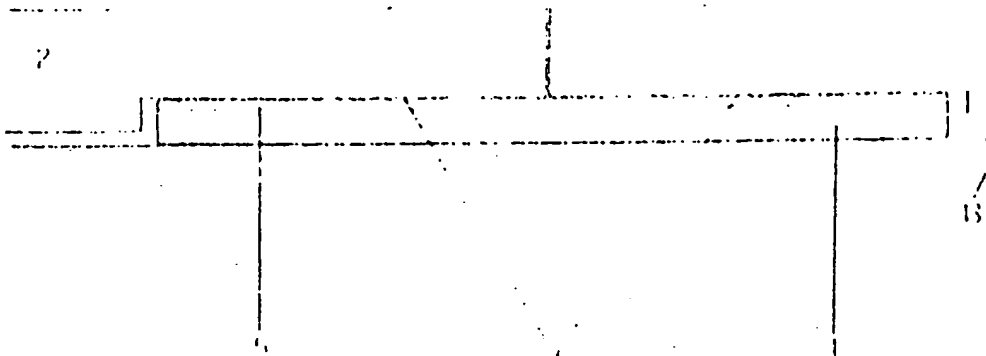
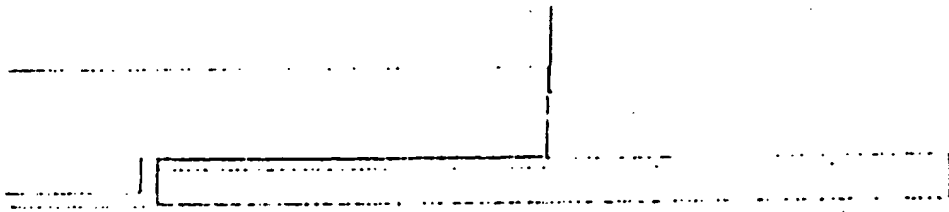


FIG. 3

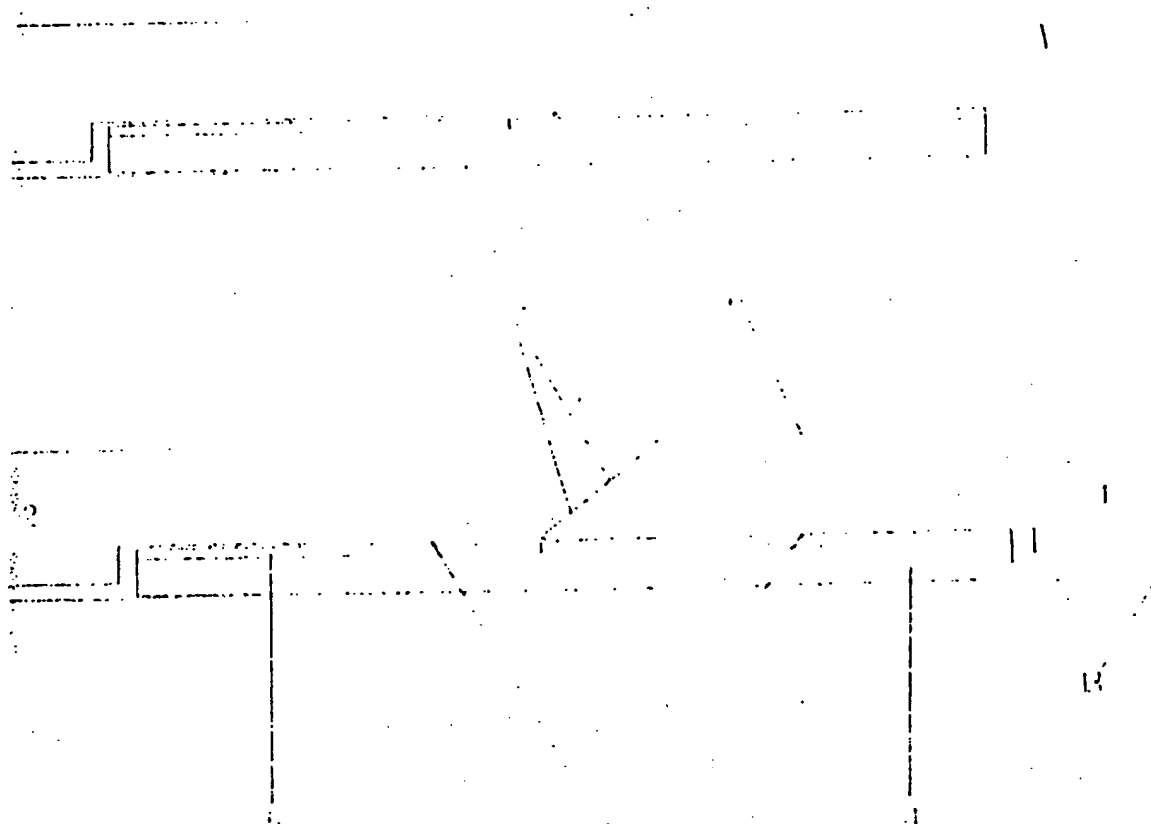


FIG. 4

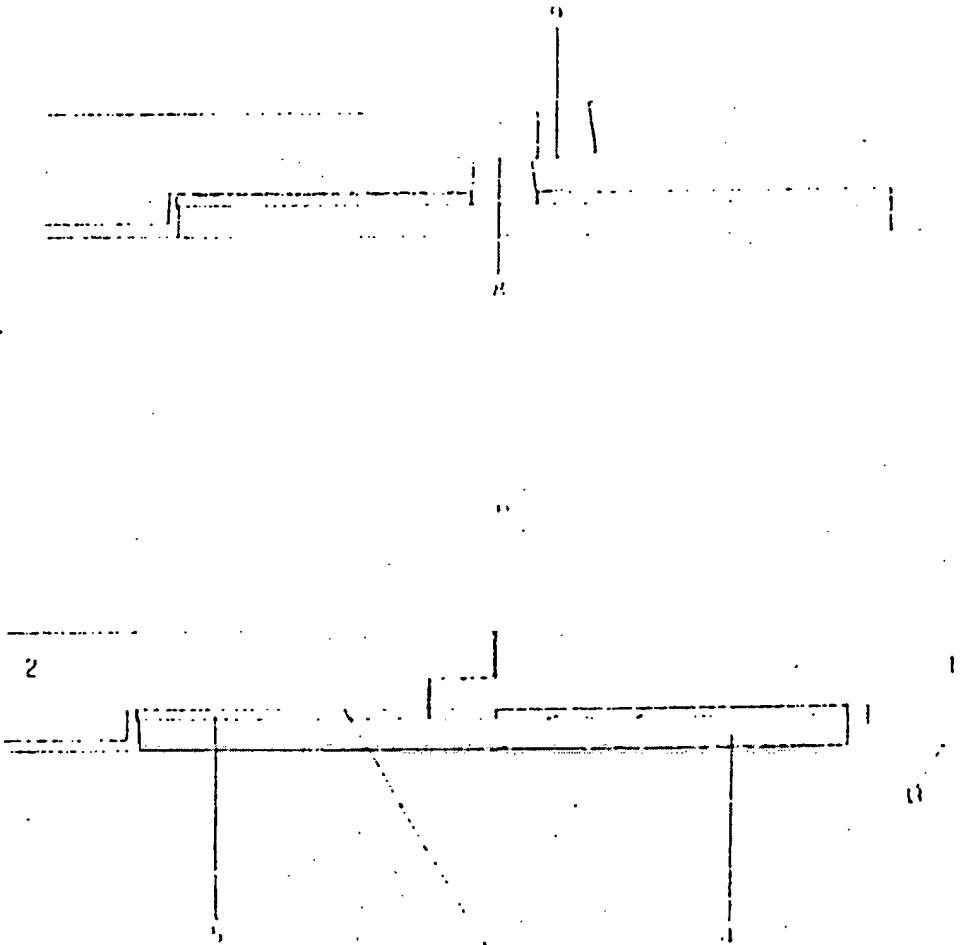
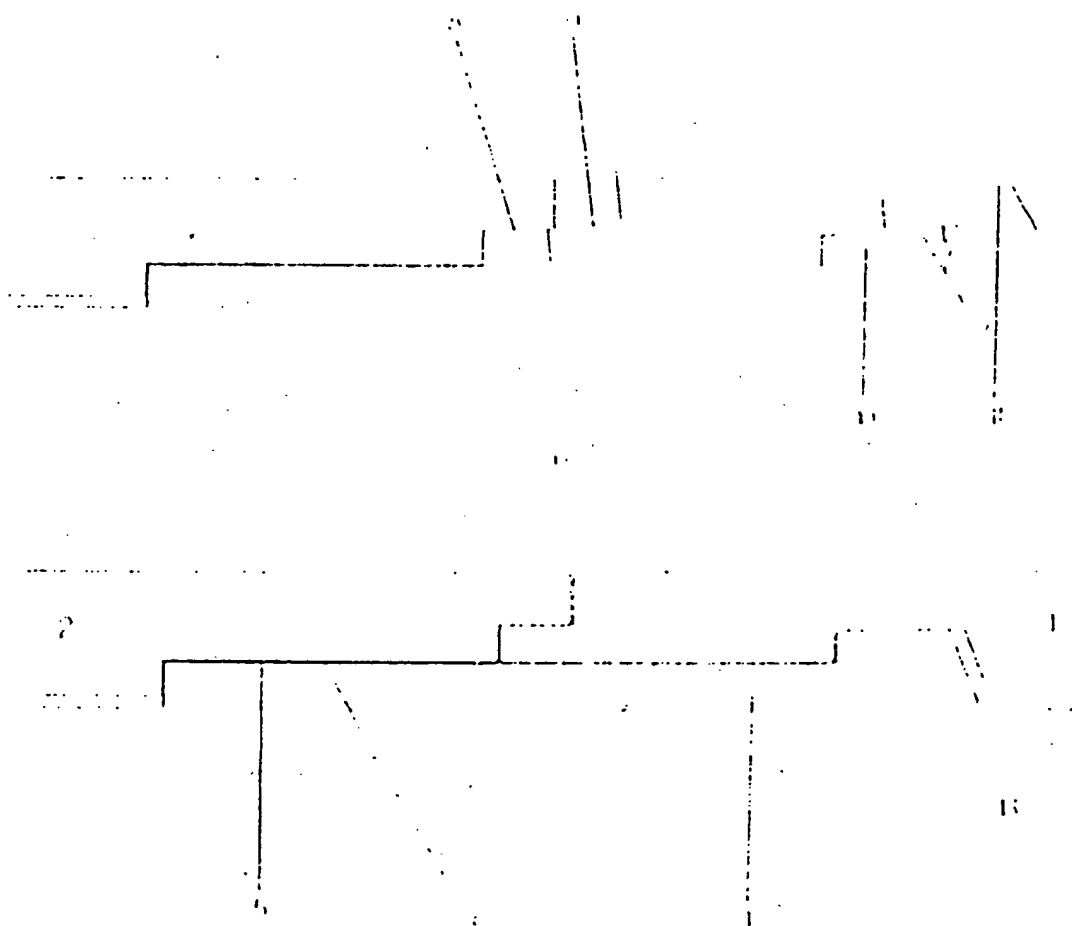


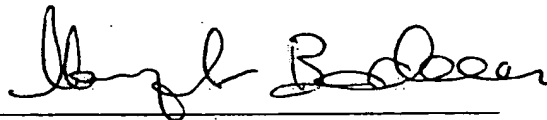
FIG. 5



DECLARATION

I, the undersigned Margareta Backen, technical translator, of Bellevuevägen 46, Malmö, Sweden, do hereby declare that I am conversant with the English and Swedish languages and am a competent translator thereof, and I further declare that to the best of my knowledge and belief the following is a true and complete translation made by me of the Swedish Patent Application No. 9301595-6 filed on the 10th of May 1993 by Tony Perván, Solna, Sweden. Having been duly assigned, this application is now being prosecuted by Välinge Aluminium AB, Viken, Sweden.

Signed this 16th day of October 1995

A handwritten signature in black ink, appearing to read 'Margareta Backen', written over a horizontal line.

Margareta Backen